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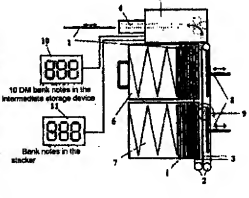
The following specifications are taken from the documents filed by the applicant

(54) Process for the control, registration, and management of bank notes in currency-operated disbursing machines

(57) The invention relates to a process for the control, registration, and management of bank notes in currency-operated disbursing machines, in particular slot machines, which comprise devices for receiving and checking bank notes which are subsequently either fed to a first stacking device or to an intermediate storage device with a withdrawal device, where the operations are controlled via an integrated control unit.

The solution will present a process for the control, registration, and management of bank notes in currency-operated disbursing machines, where via that process it can be determined how many bank notes were received and disbursed or how many bank notes are in the intermediate storage device or stacker and how processing should proceed in case of faults in the payment process.

The process according to the invention is distinguished by the fact that bank notes which are inserted, found valid as a result of the checking, and subsequently fed to the intermediate storage device are counted in a first counter of the control unit and the bank notes which are fed to the stacking device are counted in a second counter of the control unit and that bank notes to be paid from the intermediate storage device are subtracted from the stock count of the first counter.



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Description

The invention relates to a process for the control, registration, and management of bank notes in currency-operated disbursing machines, in particular slot machines, which according to DE 197 53 763 comprise devices for receiving and checking bank notes which are subsequently either fed to a first stacking device or to a second stacking device formed as an intermediate storage device and comprising a withdrawal device, where the operations are controlled via an integrated control unit.

Disbursing machines whose services can only be engaged by the insertion of money (in the form of coins and/or bank notes), have been known for a long time already.

Bank notes which are inserted into devices of this type must be checked for their validity and value by means of a bank note receiver in order subsequently to arrive, via a transport device, in stacking devices or bank note cash boxes provided for this. The value determined by the bank note receiver is customarily submitted to a central control unit which displays this value on a display, from which the service engaged (for example, its use for games, the acquisition of goods, or the performance of a service) is then subsequently debited.

In order to increase the amount of bank notes which can be fed to a device of this type and to simplify the process of withdrawing bank notes, suitable measures for stacking devices have already been proposed. A stacking device of this type is, for example, known from DE-PS 38 25 156. There, after they are accepted and after their value has been determined, the bank notes fed to the bank note receiver are fed, via a deflecting device, to the bank note stacker. In so doing, all the bank notes are deposited in the order of their insertion into the acceptor in one and the same stacking device. The disadvantage of a stacking device of this type consists in the fact that when bank notes are withdrawn later they have to be sorted by hand according to their value and counted. A further disadvantage consists in the fact that its capacity for receiving bank notes is limited since all the bank notes are deposited in one and the same stacker. This leads to frequent changing or emptying of the stacker cassettes being required, which is associated at least with a time-consuming shutdown of the device.

Furthermore, it is a known practice in a device of the generic type to provide several stacking devices for individual values according to the number of different acceptable bank notes (DE 42 02 664). In so doing, these bank notes are fed, by means of an appropriately formed transport device, to the respective stacking device for an individual value.

For a payment of bank notes from disbursing machines of this type, it has furthermore already been proposed that the bank note last inserted be "parked" before stacking it. This bank note would then in turn be available for a corresponding payment (DE 42 40 797). In so doing, it is disadvantageous that in each case only one individual note, namely that "parked" in front of the stacker, can be used for a payment. This leads to the situation that, in particular when bank notes of larger value can be inserted, often no "parked" bank notes of lower values are available for payment since the stock of these bank notes is in fact already exhausted after a single payment.

To overcome these disadvantages of the state of the art it has been proposed with the solution according to DE 197 53 763 to assign to the device for receiving and checking bank notes at least one intermediate storage device for bank notes which will also be available once again for payment and a stacking device for all the other bank notes. The transport of the bank notes to the intermediate storage device - which can also be formed as a combination of a stacking device with a withdrawal device - and to the stacking device will be done therein via revolving transport belts, in given cases with the interposition of a transport deflector.

Proceeding from this solution however, an objective presents itself to the effect that a process for the control, registration, and management of bank notes in currency-operated disbursing machines, in particular slot machines, must be found via which it can be determined how many bank notes were received and disbursed, that is, how many bank notes are in the intermediate storage device or stacker and how processing should proceed in case of faults in the payment process.

According to the invention, this objective is realized by the characterizing features of the principal claim in connection with the features of the preamble. Advantageous embodiments are presented in the subordinate claims.

The process according to the invention is distinguished by the fact that bank notes which are inserted, found valid as a result of checking, and subsequently fed to the intermediate storage device are counted in a first counter of the control unit and the bank notes which are fed to the stacking device are counted in a second counter of the control unit and that bank notes to be paid from the intermediate storage device are subtracted from the stock count of the first counter.

A first advantageous embodiment of this basic idea according to the invention consists of the fact that the bank notes to be paid from the second stacking device, formed as an intermediate storage device and comprising a withdrawal device are withdrawn and in turn are fed, via a transport device, to the device for checking bank notes. Subsequently it is checked via the device for checking bank notes whether it is also the case that only a single bank note is to be paid. If this checking yields a positive result, the bank note is disbursed. If this checking yields a negative result (at least two bank notes), the bank notes are fed to the stacking device. Then a bank note to be disbursed is once again withdrawn from the intermediate storage device, with decrementing of the first counter, and transported for disbursement via the device for checking bank notes.

A second advantageous embodiment provides that, if the checking yields a negative result, these bank notes are fed to the stacking device, where a decrement of the first counter, an increment of the second counter, and registration of a fault take place simultaneously.

Furthermore, it can be provided that, in the case that fault registrations are found and/or for checking the actual stock count in the intermediate storage device, all the bank notes contained therein are disbursed with a count. Subsequently, the actual stock count is compared to the theoretical stock count and the difference found is displayed or printed. Then, after resetting the first counter, all the previously disbursed bank notes can be inserted into the intermediate storage device once again with a fresh count in the first counter.

A procedure alternative to this provides that, in the case that fault registrations are found and/or for checking the actual stock count in the intermediate storage device, all the bank notes contained therein are withdrawn and counted and the total is compared to the intermediate storage device's theoretical stock count, which has been displayed and/or printed.

Also here, after resetting the first counter, all the previously withdrawn bank notes can once again be inserted directly into the intermediate storage device with their number being input.

In addition, it can be provided that the theoretical stock count of the stacking device according to the second counter state is displayed and/or printed, that all the bank notes are withdrawn from the stacking device and counted and subsequently the actual stock count and theoretical stock count are compared. Then the bank notes which were found as the difference between the actual stock count and theoretical stock count in the intermediate storage device are diverted. These bank notes are then fed again to the intermediate storage device with count being kept in the first counter. Subsequently, the second counter is reset automatically or manually.

In addition, it can be provided that, if the result of checking is negative in connection with a bank note payment, at least the date and/or time and/or conjectured number of bank notes simultaneously withdrawn from the intermediate storage device are stored in a storage device for fault registration, and that the stacking device and the intermediate storage device are each secured and/or locked separately or together.

In the following, the process according to the invention will be explained in more detail with the aid of the figures. Therein figure 1 and figure 2 each show one possible form of the arrangement of essential functional elements.

Receiving a 10 DM bank note 1 will be the starting point for the more detailed description of the invention.

For this, the 10 DM bank note 1 is fed to the device 4, 5 for receiving and checking bank notes 1 and after successful checking is transported to the intermediate storage device 7, which consists of a stacking device and a withdrawal device 9. The transport is done via the transport device 2, 3 which consists of at least partially driven rollers 2 and transport belts 3 running around them.

If the bank note 1 is in front of the intake opening of the intermediate storage device 7, then it is pressed by means of movable stamp 8 into the intermediate storage device 7.

In addition, the first counter 10 is incremented by one. This can take place immediately after the checking of the bank note 1 or after its intake into the intermediate storage device 7.

If a 20 DM bank note 1 which is not supposed to be provided for later payments is inserted, then it is also checked via the device 4, 5 and, if that checking is positive, transported, via the transport device 2, 3, to the stacking device 6 and there pressed, via the movable stamp 8, into the stacking device 6. In addition, the second counter 11 is incremented by one.

If a 10 DM bank note 1 is supposed to be paid, then the withdrawal device 9 in the intermediate storage device 7 is activated and a bank note 1 is withdrawn from the intermediate storage device 7. Subsequently, this bank note 1 is in turn transported via the transport device 2, 3, now running in the reverse direction, back to the device 4, 5 for checking of the bank notes 1.

Via the device 4, 5 it is then determined whether actually only one bank note 1 was withdrawn from the intermediate storage device 7.

If only one bank note 1 was withdrawn, then it is disbursed and the first counter 10 is decremented by one.

If, however, it is found that at least two bank notes 1 were withdrawn, then they are in turn transported back via the transport device 2, 3, but now to the stacking device 6. There the bank notes 1 are stacked in the manner described above and are no longer available for further payment. At the same time, the first counter 10 is decremented by one and the second counter 11 is incremented by one. Since the actual stock count in the intermediate storage device 7 (at least one bank note too few) and in the stacking device 6 (at least one bank note too many) no longer agrees with the theoretical stock count, a fault is registered in addition. Relating to this, date, time, and in given cases the conjectured number of faulty withdrawals from the intermediate storage device 7 are stored.

Subsequently, a bank note 1 is withdrawn again from the intermediate storage device 6 and processed in the manner described above.

If the actual stock count in the intermediate storage device 7 will be determined at a later time, then two alternative procedures can be used for this.

A first procedure consists of all the bank notes 1 still present in the intermediate storage device 7 being disbursed with a count. Subsequently, the actual stock count determined thereby is compared to the theoretical stock count and a difference present in given cases is displayed or printed. Such a difference arises, for example, with simultaneous withdrawal of several bank notes 1 from the intermediate storage device 7. Since initially it is not known precisely whether two, three, or even more bank notes 1 were withdrawn simultaneously, initially only the fault as such is registered and the "bundle" of bank notes 1 is stacked in the stacking device 6.

Subsequently, the bank notes 1 disbursed with a count being kept can then be inserted once again, where the counter 10 is once again set to the actual stock count of the intermediate storage device 7.

Since here all the counting processes run within the overall device, this possibility offers no room for manipulations.

The second procedure can consist of all the bank notes 1 still contained in the intermediate storage device 7 being withdrawn and counted. The actual stock count determined thereby is then compared to the theoretical stock count displayed or printed. A new actual stock count is input and the corresponding number of bank notes 1 is put into the intermediate storage device 7.

Since here the counting takes place outside of the overall device, this variant offers approaches for subsequent manipulations.

In both cases it would have to be possible, with proper execution of the determination of the actual stock count in the intermediate storage device 7, to rediscover differences possibly occurring in the stacking device 6.

If, for example, from an original actual stock count of thirty five 10 DM bank notes 1 in the intermediate storage device 7, ten proper payments were made and two faulty withdrawals were found, then the current theoretical stock count would be twenty three 10 DM bank notes 1. If a check shows that the actual stock count is twenty one 10 DM bank notes 1, then this means that in each of the two faulty withdrawals two bank notes 1 were withdrawn, which would now have to be in the stacking device 6 as an excess.

In order to check this, the bank notes 1 from the stacking device 6 are counted and compared to the theoretical stock count, which has been displayed or printed. The two 10 DM bank notes 1 which are excess in the normal case can now be fed to the intermediate storage device 7 once again while incrementing the counter 10.

If the bank notes 1 are withdrawn from the stacking device 6, then the second counter 11 must be reset manually or automatically and the entire process of bank note withdrawal, registration, and management in this currency-operated disbursing machine can begin anew with correct values.

Since possibly the stored amounts of money from intermediate storage device 7 and those from the stacking device 6 are divided differently between the distributor and the vendor, there is the possibility that both devices are secured or locked separately so that thereby monitoring of the possible access to the different amounts of money is also ensured.

Claims

1. Process for the control, registration, and management of bank notes in currency-operated disbursing machines, in particular slot machines, which according to DE 197 53 763 comprise devices for receiving and checking bank notes which are subsequently either fed to a first stacking device or to a second stacking device formed as an intermediate storage device and comprising a withdrawal device, where the operations are controlled via an integrated control unit, characterized by the fact that that bank notes (1) which are inserted, found valid as a result of checking, and subsequently fed to the intermediate storage device (7) are counted in a first counter (10) of the control unit (5) and the bank notes (1) which are fed to the stacking device (6) are counted in a second counter (11) of the control unit (5) and that bank notes (1) to be paid from the intermediate storage device (7) are subtracted from the stock count of the first counter (10).

2. Process for the control, registration, and management of bank notes in currency-operated disbursing machines according to claim 1, characterized by the fact that bank notes (1) to be paid are withdrawn from the stacking device formed as an intermediate storage device (7) and comprising withdrawal device (9) and in turn are fed, via a transport device (2, 3), to the device (4, 5) for checking bank notes,

that subsequently it is checked via the device (4, 5) for checking bank notes (1) whether it is also the case that only a single bank note (1) is to be paid,

that, if the result of this checking is a positive, the bank note (1) is disbursed,

that, if the result of this checking is a negative, (at least two bank notes (1)), the bank notes (1) are fed to the stacking device (6) and that, starting over, a bank note (1) to be disbursed is withdrawn from the intermediate storage device (7), with decrementing of the first counter (10), and transported for disbursement to the device (4, 5) for checking bank notes (1).

3. Process for the control, registration, and management of bank notes in currency-operated disbursing machines according to claim 2, characterized by the fact that, if the result of checking is negative, these bank notes (1) are fed to the stacking device (6) with simultaneous decrementing of the first counter (10), incrementing of the second counter (11), and registration of a fault.

4. Process for the control, registration, and management of bank notes in currency-operated disbursing machines according to at least one of the foregoing claims 1 to 3, characterized by the fact that,

in the case that fault registrations are found and/or for checking the actual stock count in the intermediate storage device (6), all the bank notes (1) contained therein are disbursed with a count, that subsequently the actual stock count is compared to the theoretical stock count and the difference found is displayed or printed, and

that, after resetting the first counter (10), all the previously disbursed bank notes (1) are inserted once again into the intermediate storage device (7) with a fresh count in the first counter (10).

5. Process for the control, registration, and management of bank notes in currency-operated disbursing machines according to at least one of the foregoing claims 1 to 3, characterized by the fact that,

in the case that fault registrations are found and/or for checking the actual stock count in the intermediate storage device (7), all the bank notes (1) contained therein are withdrawn, counted, and compared to the theoretical stock count of the intermediate storage device (7) displayed and/or printed, and that, after resetting the first counter (10), all the previously withdrawn bank notes (1) are once again inserted directly into the intermediate storage device (7) with their number being input.

6. Process for the control, registration, and management of bank notes in currency-operated disbursing machines according to claim 1 and/or 2 or 3, characterized by the fact that,

the theoretical stock count of the stacking device (6) according to the second counter state (11) is displayed and/or printed,

that all the bank notes (1) are withdrawn from the stacking device (6) and counted and subsequently the actual stock count and theoretical stock count are compared,

that subsequently the bank notes (1) which were found as the difference between the actual stock count and theoretical stock count in the intermediate storage device (7) are diverted,

that these bank notes (1) are then fed anew to the intermediate storage device (7) with counting in the first counter (10) and that subsequently the second counter (11) is reset by automatically or manually.

7. Process for the control, registration, and management of bank notes in currency-operated disbursing machines according to at least one of claims 1 to 7, characterized by the fact that, if the result of checking is negative in connection with a bank note payment, at least the date and/or time and/or conjectured number of bank notes (1) simultaneously withdrawn from the intermediate storage device (7) are stored in a storage device for fault registration.

8. Process for the control, registration, and management of bank notes in currency-operated disbursing machines according to at least one of claims 1 to 7, characterized by the fact that the stacking device (6) and the intermediate storage device (7) are each secured and/or locked separately or together.

1 Page of Drawings Appended

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Fig. 1a

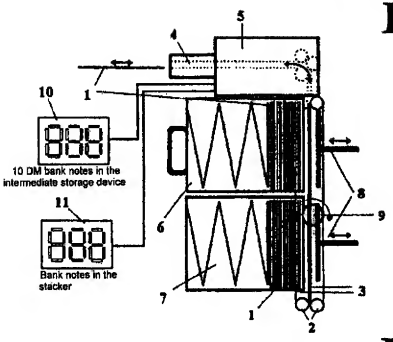

Fig. 1b